Original Article

Early Laparoscopic Cholecystectomy Versus Interval Laparoscopic Cholecystectomy in Acute Cholecystitis; A Comparative Study in A Tertiary Care Hospital

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Abstract

Introduction: Acute cholecystitis, often caused by gallstones blocking the cystic duct, leads to gallbladder inflammation. Symptoms include anorexia, nausea, vomiting, fever, and right upper quadrant discomfort. Gallstones are present in 95% of cases. Severe cases may result in gangrenous cholecystitis with gallbladder wall necrosis. Conservative management includes intravenous fluids, analgesia, and antibiotics, but early cholecystectomy is the preferred treatment, offering quicker recovery. Laparoscopic cholecystectomy is the gold standard, with the timing of surgery debated. Some advocate for early surgery, while others consider it risky, opting for elective cholecystectomy after the initial phase.

Aim of the study: The study aims to compare the outcomes of early surgery with interval or delayed surgery for acute cholecystitis at a tertiary care hospital in Khulna, Bangladesh.

Methods: This prospective comparative study at Khulna Medical College and Hospital focused on acute cholecystitis patients 2.5 years from June 2020 to December 2023. Thirty patients were divided into two groups: Group A underwent early cholecystectomy (N=64), and Group B had interval cholecystectomy after conservative management (N=64). Inclusion criteria involved symptoms, optimistic Murphy's sign, and elevated leukocyte count. Exclusion criteria included specific complications and comorbidities. Thorough examinations, baseline investigations, and pre-anesthetic workups were conducted. Operative principles included stabilizing patients, antibiotic therapy, and early or interval cholecystectomy based on group allocation. Continuous monitoring and follow-ups were performed, revealing varied adherence to scheduled appointments

Result: A total of 128 patients were divided into two groups (A and B) for a comparative analysis; Group A had a prominent age range of 41-50 (26.56%), while Group B had a majority in the 51-60 age range (42.19%). Gender distribution showed a higher proportion of females in both groups. Types of operations were similar, with laparoscopic cholecystectomy being predominant. Complication rates were 26.56% in Group A and 18.75% in Group B, hemorrhage was common in both groups. Outcomes were comparable, including nausea, vomiting, and surgical site infections but there were no bile injurie. Mean hospital stays were 2.54 days for Group A and 2.76 days for Group B, with no significant differences.

Conclusion: Despite minor age differences, both groups had similar outcomes, complications, and postoperative issues. The study suggests both approaches are viable with comparable safety and efficacy, emphasizing individualized considerations.

Keywords: Laparoscopic cholecystectomy, early, interval, and acute cholecystitis.

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Introduction

When a gallstone typically blocks the cystic duct, acute cholecystitis develops, causing the gallbladder to expand and causing inflammation due to bacteria or chemicals[1]. Anorexia, nausea, vomiting, fever, and persistent right upper quadrant discomfort are common symptoms of acute cholecystitis. Gallstones (calculous cholecystitis) are present in around 95% of patients with acute cholecystitis, and 5% do not have gallstones (acalculous cholecystitis). Gangrenous cholecystitis, or severe acute cholecystitis, is characterized by gallbladder wall necrosis[1]. Acute cholecystitis is a frequent surgical condition that affects both genders equally[2]. Gallstones rank among the most prevalent gastrointestinal disorders, impacting approximately 10% of the Western population[3]. Research conducted

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among rural people in Bangladesh's southern coastline area found that the overall frequency of gallstone disease was 5.4%[4]. Surgeons sometimes favor the conservative management of acute cholecystitis, employing intravenous fluids and analgesia, often in combination with antibiotics[5]. However, the most suitable therapy for those with acute cholecystitis is cholecystectomy. It is preferable to do an early cholecystectomy two to three days after presentation. A delayed or over-interval cholecystectomy is carried out six to ten weeks following the start of medical treatment. Approximately 20% of patients require surgery either during the initial admission or before the anticipated cooling-off period because they do not respond well to early medicinal treatment[6]. Compared to open cholecystectomy, laparoscopic cholecystectomy (LC) improves quality of life more quickly. As a result, it has gained more clinical recognition and is currently the gold standard for cholecystectomy[7]. The best time to operate on individuals with acute cholecystitis is an area of debate [8]. Some studies suggest early surgery as the preferred treatment option, and Ganey et al. endorse this approach, highlighting its effectiveness with an exceptionally low mortality rate of 0.5%[9]. Various randomized studies have yielded diverse outcomes concerning hospital stay, surgery feasibility, and operative morbidity rates[8]. According to Alinder et al, the majority of surgeons still view an early cholecystectomy as a risky procedure, and they typically only conduct it when a patient's condition deteriorates during the first 24 to 48 hours after admission[10]. An elective cholecystectomy is performed once the initial assault has subsided, usually within 4 to 6 weeks[11]. The study aims to compare the outcomes of early surgery with interval or delayed surgery for acute cholecystitis at a tertiary care hospital in Khulna, Bangladesh.

Methodology & Materials

This prospective comparative was carried out in the Department of Surgery at Khulna Medical College and Hospital. The study duration was 2.5 years, from June 2020 to December 2023. Throughout this period, a total of 340 patients presenting symptoms indicative of acute cholecystitis were admitted to the hospital. Among these patients, 174 underwent laparoscopic cholecystectomies, divided into two distinct groups. Sixty-four cases received early definitive cholecystectomy (Group A), while the remaining 110 cases were managed conservatively and subsequently discharged. Those in the conservative management group were readmitted for cholecystectomy after a 4-6-week interval. Due to a lack of follow-up data, 46 patients were excluded from Group B. Ultimately, each group consisted of 64 patients for analysis.

Group A (N=64): Early cholecystectomy was performed.

Group B (N=64): Interval cholecystectomy after initial conservative management.

- Inclusion criteria
- Individuals experiencing abdominal pain indicative of acute cholecystitis, displaying an optimistic Murphy's sign, a total leukocyte count exceeding 10,000/μl, and confirmed acute cholecystitis through ultrasonographic findings.
- Exclusion criteria
- Patients with ultra-sonographic findings of common bile duct calculi/pancreatitis/gall bladder perforation/gall bladder gangrene/gall bladder abscess.
- Patients with other associated abdominal pathology.
- Patients with any previous abdominal surgery, septic shock, pregnancy/breast-feeding mothers, patients with any significant systemic disease.
- Patients who were missing follow-up.

All individuals thoroughly examined their medical history, encompassing chief complaints, current and past illnesses, personal details, family background, prior treatments, and medication usage. Subsequently, comprehensive physical assessments were conducted, such as general surveys, abdominal examinations, and other systemic evaluations. The chosen participants were then subjected to baseline investigations, including a routine blood examination, which involved assessing hemoglobin levels, total leukocyte count, differential leukocyte count, erythrocyte sedimentation rate (ESR), random blood sugar (RBS), urea, and creatinine levels. Leucocytosis was commonly observed in most patients with uncomplicated acute cholecystitis. Liver function tests were also performed, covering total serum bilirubin, liver enzymes, and protein levels. The coagulation profile, including prothrombin time, chest X-ray (posteroanterior view), and electrocardiogram, constituted essential components of the pre-anesthetic workup. A plain abdomen X-ray was also conducted to rule out other potential acute abdominal conditions.

Operative principles: Initially, the patient's condition was stabilized through interventions such as fluid and electrolyte correction, IV antibiotics, and supportive measures like antiemetics. Subsequently, an anesthetic evaluation was conducted. Individuals presenting with symptoms of acute cholecystitis were considered for early cholecystectomy from an elective optional list. In Group A, patients were offered early laparoscopic cholecystectomy within seventy-two hours. Meanwhile, the second group of patients was provided with the option of interval laparoscopic cholecystectomy, to be performed six weeks after the onset of acute cholecystitis symptoms. All surgical procedures were performed during the same hospital admission in the early surgery group. Continuous monitoring and follow-up of patients occurred in the surgical outpatient department, with regular check-ups scheduled at two weeks, six weeks, and six months, although some patients had irregular follow-ups.

Data analysis: Data were organized in appropriate tables or graphs based on their relationships. A comprehensive description accompanied each table and graph to facilitate clear comprehension. Statistical analysis was done using the Statistical Package for the Social Sciences (SPSS) program on Windows. Continuous parameters were presented as mean±SD, while categorical parameters were expressed as frequency and percentage. Group comparisons for continuous parameters were conducted using the student's t-test, and the Chi-Square test was employed for categorical parameter comparisons. Results were deemed statistically significant if the P-value was less than 0.05.

Result

In this prospective comparative study, 128 patients were enrolled and analyzed into two groups. The study age distribution is shown in Table 1. Specifically, in Group A, the age range of 41-50 emerged prominently, constituting the highest percentage at 26.56%. In contrast, Group B exhibited a distinct pattern, with the majority of patients, a significant 42.19%, falling within the 51-60 age range. This divergence in age distribution is underscored by the calculated mean ages of the two groups, with Group A presenting a mean age of 43.65±15.23 and Group B demonstrating a slightly higher mean age of 47.13±15.75. The statistical analysis revealed a non-significant p-value of 0.578 (Table 1). Figure 1 illustrates the gender distribution as it shows both groups have a higher proportion of female participants than male participants. In Group A, 81.25% of the patients were female and 18.75% were male. In contrast, 73.44% were female, and 26.56% were male in Group B, according to the types of operations within the two study groups. In Group A, laparoscopic cholecystectomy was the predominant procedure, accounting for 93.75% of cases, while 6.25% necessitated a lap-to-open conversion. Conversely, in Group B, laparoscopic cholecystectomy remained the primary approach, constituting 87.50% of cases, with a slightly higher lap-to-open conversion rate at 12.50%. The calculated p-value of 0.216 suggests that the observed differences in the types of operations between the two groups are not statistically significant. Table 3 presents the complications observed in the study population, categorized by group. Hamorrhage occurred in 20.31% of cases, and 6.25% experienced a failure to proceed, necessitating conversion to an open procedure. However, in Group B, hamorrhage occurred in 12.50% of cases, and 6.25% reported a failure to proceed. No cases of bile duct injury were reported in both groups. The complication rates were slightly higher (26.56%) in Group A than in Group B (18.75%). Table 4 shows the study outcomes stratified by group. As in Group A, nausea and vomiting were reported in 12.50% of cases, and surgical site infections occurred in 6.25%. Whereas, in Group B, the prevalence of nausea and vomiting was also 12.50%, while surgical site infections occurred in 12.50%. No instances of bile discharge were documented in either group. The overall occurrence of outcomes was 18.75% for Group A and 26.56% for Group B. The mean hospital stays were 2.54±1.32 days for Group A and 2.76±1.45 days for Group B.

Table 1: Age distribution of the study population.

Age group (years)	Group-A (N=64)		Group-B (N=64)		P-value
	n	%	n	%	
20-30	13	20.31	17	26.56	0.578
31-40	13	20.31	8	12.50	
41-50	17	26.56	4	6.25	
51-60	13	20.31	27	42.19	
>60	8	12.51	8	12.50	
Mean±SD	43.65±15.23		47.13±15.75		

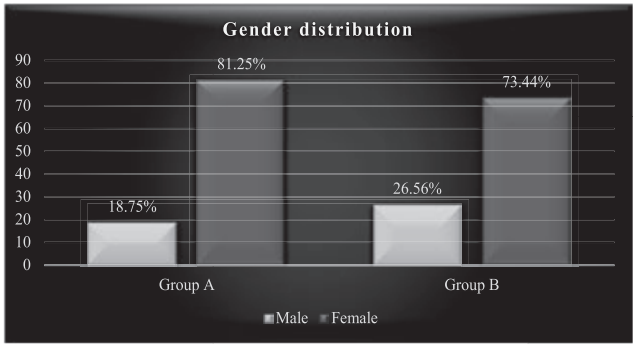

Figure 1: Gender distribution of both groups.

Table 2: Type of operation based on groups.

Type of operation	Group-A (N=64)		Group-B (N=64)		P-value
	n	%	n	%	
Lap cholecystectomy	60	93.75	56	87.50	
Lap to open conversion	4	6.25	8	12.50	0.216
Total	64	100.00	64	100.00	

Table 3: Complication of study population based on groups.

Complication	Group-A (N=64)		Group-B (N=64)		P-value
	n	%	n	%	
Hemorrhage	13	20.31	8	12.50	
Bile duct injury	0	0	0	0	>0.05
Failure to proceed (conversion to open)	4	6.25	4	6.25	
Total	17	26.56	12	18.75	

Table 4: Outcomes of the study based on groups.

Outcomes	Group-A (N=64)		Group-B (N=64)	
	n	%	n	%
Nausea vomiting	8	12.50	8	12.50
Surgical site infection	4	6.25	8	12.50
Bile discharge	0	0	0	0
Total	12	18.75	16	25.00
Hospital stays (days)	Mean±SD		Mean±SD	
	2.54±1.32		2.76±1.45	

Discussion

Cholelithiasis is an illness that comes with many difficulties. Acute cholecystitis is related to several risk factors; however, it may put surgeons at risk for a challenging dissection because of Callot's triangle adhesion. Two distinct approaches exist for managing this illness. Prospective research was established to compare the two methods of treating acute cholecystitis. It was discovered that the best method of action for treating individuals with acute cholecystitis was an early cholecystectomy carried out seventy-two hours after the first onset of symptoms. Our study compared the results of early vs interval cholecystectomy in terms of age, gender, type of operation, complications and hospital stay. According to our study findings, the mean age for early cholecystectomy was 43.65 years, and interval cholecystectomy was 47.13 years. A study by Singh and Al-Salamah et al. found the mean age of both groups to be almost similar to ours[12, 13]. In this current study, most patients in both groups were females, similar to another study[12,14]. Our open conversation rate was minimal in both groups (one patient in group A and two patients in group B), and it shows non-significance with a p-value of 0.216 (Table 2). A comparison between the two groups was conducted regarding both operative and post-operative complications. It was observed that 13(20.31%) patients in Group A experienced primary haemorrhage, whereas in Group B, 8(12.50%) patients experienced the identical complication. A study by Mahmood et al. found 32.00% in the early LC group and 14.00% in the interval LC group, which is almost similar to ours[15]. Nevertheless, it is noteworthy that all instances of haemorrhage were effectively managed without complications. Additionally, none of the patients experienced bile duct injuries. Various research provides varying outcomes regarding problems following surgery[16,17]. Post-operative complications in both groups were assessed, focusing on factors such as nausea and vomiting, surgical site infection, and bile discharge [18,19]. Post-operative nausea and vomiting were present in 12.50% of cases in both groups. Surgical site infection occurred in four patients in Group A, while eight patients in Group B experienced identical complications. However, none of the patients in both groups exhibited post-operative bile discharge. Similar findings were reported in the research projects led by Aggarwal S. and Shikata S.[20,21]. The research examined the length of hospital stays for two groups. In group A, the average length of stay was 2.54±1.34 days. On the other hand, group 2's average hospital stay was 2.76±1.45 days. The outcomes of Lau H's study were comparable[22]

Limitations of the study: Despite the valuable insights gained from this comparative study on early laparoscopic cholecystectomy versus interval laparoscopic cholecystectomy in acute cholecystitis, several limitations must be acknowledged. Firstly, the sample size of 128 patients, though sufficient for a preliminary assessment, may not fully capture the heterogeneity of patients with acute cholecystitis. A more extensive and diverse sample could provide a more comprehensive understanding of the outcomes of each approach. Additionally, the study's single-centre design within the Department of Surgery may limit the generalizability of the findings to broader populations and healthcare settings. Variability in surgical expertise, equipment, and patient demographics across different institutions could impact the external validity of the results.

Conclusion And Recommendations

This study compared early laparoscopic cholecystectomy (Group A) with interval laparoscopic cholecystectomy after conservative management (Group B) for acute cholecystitis in a Khulna, Bangladesh hospital. Despite minor age differences, both groups had similar gender distributions. Surgical outcomes, complications, and postoperative issues did not significantly differ between the two groups. Rates of laparoscopic cholecystectomy and conversions were comparable, with minimal differences in complication rates. Postoperative complications, including nausea and infections, showed similar patterns. No significant differences were observed in hemorrhage, failure to proceed, or hospital stay. The study suggests that both approaches are viable with comparable safety and efficacy, emphasizing the need for individualized considerations.

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Ethical approval: The study was approved by the Institutional Ethics Committee.

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